SIDS INTITIAL ASSESSMENT PROFILE

CAS Number	1646-75-9
Chemical Name	2-Methyl-2-methylthiopropanal oxime
Molecular formula	$C_5H_{11}NOS$

CONCLUSIONS AND RECOMMENDATIONS

It is currently considered of low priority for further work.

SHORT SUMMARY WHICH SUPPORTS THE REASONS FOR THE CONCLUSIONS AND RECOMMENDATIONS

2-Methyl-2-methylthiopropanal oxime or Aldicarb oxime (ADO) is produced as a pure liquid and sold industrially as an intermediate for the production of an agricultural pesticide. Production occurs in sealed systems. Significant airborne levels of the substance are also not expected due ADO's low vapour pressure. Monitoring data have also shown low inhalation exposure.

ADO is very soluble and hydrolytically stable in water. In the aquatic environment ADO is not readily biodegradable. Released ADO will most likely partition with the highest concentrations in water and soil. Based on the water solubility and expected low LogPow, bioaccumulation is expected unlikely.

ADO is considered as slightly to moderately toxic to aquatic organisms rainbow trout, bluegill sunfish, *Daphnia magna* and fresh green alga. Concentrations of 500 mg ADO/L or less have been reported to have no inhibitory effect on the metabolism of activated sludge microorganisms.

ADO is only slightly toxic after acute oral exposure and moderately toxic via acute inhalation exposure. Acute dermal data indicates ADO is also slightly too moderately toxic by this route although the validity of the available study is questionable. ADO was found to be moderately irritating to the skin and corrosive to the eyes. No data on skin sensitisation are available for ADO. Toxic effects observed in adequate repeated dosing ADO diet studies of 7 days and 13-weeks were limited to depression of body weights which may have been an indirect effect of ADO as food consumption was reduced in the affected animals. Reproductive organs evaluated microscopically in the 13- week study were not affected by ADO. Also no effects for the testes or ovaries after microscopic pathological examination were reported in an oral gavage one-generation reproduction toxicity study.

Negative results for mutagenicity were found in two Ames tests. ADO was negative in the mouse lymphoma test in the presence of metabolic activation, but found

positive in the absence of metabolic activation. No *in vivo* genotoxicity studies are available. No conclusion can be drawn for the endpoint mutagenicity and further work is recommended.

IF FURTHER WORK IS RECOMMENDED, SUMMARISE ITS NATURE

The appropriate log Pow must be made available.

Additional data on chromosomal aberrations should be made available.

SIDS Initial Assessment Report

For

ALDICARB OXIME

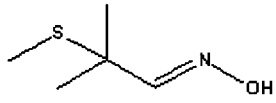
1. Chemical Name:	2-Methyl-2-Mmethylthiopropanal oxime
2. CAS Number:	1646-75-9
3. Sponsor Country:	Honeywell International Inc. 101 Columbia Road Morristown, NJ 07962
4. Shared Partnership with:	-
5. Roles/Responsibilities of the Partners:	
• Name of industry sponsor	Honeywell International Inc.
• Process used	-
6. Sponsorship History	
• How was the chemical or category brought into the OECD HPV Chemicals Programme ?	-
7. Review Process Prior to the SIAM:	The initial test plan was submitted to EPA in December 2003. Comments from the EPA were received on 8/20/04. A letter describing the plan for testing was submitted to EPA 10/22/04. The letter from EPA confirming this plan was received in August 2004.
8. Quality check process:	-
9. Date of Submission:	
10. Date of last Update:	January 2006
11. Comments:	-

CONTENTS

1 IDENTITY

1.1 Identification of the Substance

CAS Number: 1646-75-9
IUPAC Name: -
Molecular Formula: $C_5H_{11}NOS$
Structural Formula:



Molecular Weight: 133
Synonyms: 2-methyl-2-methylthiopropanal oxime
2-methyl-2-(methylthio)propionaldehyde oxime
2-methyl-2-(methylthio)propionaldoxime
propanal, 2-methyl-2-(methylthio)-, oxime
propionaldehyde,2-methyl-2-(methylthio)-, oxime
2-(methylthio)isobutyraldehyde oxime
Temik oxime

Aldicarb oxime is a clear, colourless organic liquid with a pH of 7.

1.2 Purity/Impurities/Additives

The substance is produced and sold as a pure liquid with a purity of > 99%. The marketed substance contains no (significant) impurities. There are no additives used.

1.3 Physico-Chemical properties

Table 1 Summary of physico-chemical properties

Property	Value	References
Physical state	Clear, colourless liquid	-
Melting point	21°C	Arthur D. Little (1989)
Boiling point	210°C (partial decomposition)	Arthur D. Little (1989)
Relative density (specific gravity)	1.05 g/mL	Arthur D. Little (1989)
Vapour pressure	< 0.1 mmHg at 20°C	Arthur D. Little (1989)
Water solubility	2.5 wt.% at 22°C	Honeywell International Inc. (2000)
Partition coefficient n-octanol/water (log value)	15.1	Allied Chemical Safety Data Sheet (1981)
Henry's law constant	$7.12e^{-0.07}$ atm.-m^3/mole	-
Flash point	118°C	Honeywell International Inc. (2000)
Autoflammability	285°C	Honeywell International Inc. (2000)
Flammability	Not flammable	Honeywell International Inc. (2000)

2 GENERAL INFORMATION ON EXPOSURE

2.1 Production Volumes and Use Pattern

The total quantity of aldicarb oxime produced on a yearly basis is 1 – 5 MM lbs. Aldicarb oxime is produced by Honeywell International Inc. at its plant in Hopewell Virginia. It is used by a single recipient of the substance as an agricultural intermediate in the production of carbamate pesticides.

2.2 Environmental Exposure and Fate

2.2.1 Sources of Environmental Exposure

No data are available.

2.2.2 Photodegradation

No data are available.

2.2.3 Stability in Water

Aldicarb oxime is reported to be stable and soluble in water. Measurement of saturated solutions of the substance using HPLC revealed that the substance is stable for at least 15 days (Allied Chemical Corporation, 1981a). In a preliminary study the % hydrolysis of AAO at pH 4.0, 7.0 and 9.0 (at

50°C) was found to be less than 10% under all test conditions. Therefore, the substance is considered to be hydrolytically stable (Verhoef and Kerkdijk, 2005).

2.2.4 Transport between Environmental Compartments

Transport between environmental compartments is calculated using Level III Fugacity Model. The input data used are:
- water solubility: 25,000 mg/L
- vapor pressure: 0.1 mm Hg
- Log Kow = 15.1
- boiling Point: 210°C
- melting point: 21°C

	Percent	Half-life	Emissions
Air	1.92%	59 hr.	1000 kg/hr
Water	6.97%	360 hr.	1000 kg/hr
Soil	29.2%	360 hr.	1000 kg/hr
Sediment	61.9%	1.44 e^3	0

The persistence time is calculated to be 669 hr.

2.2.5 Biodegradation

ADO was found to be not ready biodegradable in a CO_2 evolution test using a mixed culture, derived from activated sludge and soil (Allied Corporation (1982). At a temperature of 23 ± 4^0C, the cumulative release of CO_2 was 2.62%, while the cumulative soluble organic carbon removal was <1.0%.

2.2.6 Bioaccumulation

The log Log P_{ow} is reported to be of 15.1 (Allied Chemical Product Safety Data Sheet, 1981). This is an unreliable value. Due to the high solubility of the test substance a very low log Pow is expected. Therefore, bioaccumulation is unlikely.

2.2.7 Other Information on Environmental Fate

Using **Model AopWin v1.91** the overall OH rate constant and soil adsorption were calculated:
Hydroxyl Radical Reaction:
Overall OH Rate Constant = 4.3506 e^{-12} cm^3/molecule-sec
Half-life = 2.459 days (12-hr day; 1.5 e^6 OH/$cm^{3)}$

Soil Adsorption (PCKOCWIN v1.66):
Koc = 380.8 log Koc = 2.581

2.3 Human Exposure

2.3.1 Occupational Exposure

Aldicarb oxime is produced at only one Honeywell site, for one customer, where it is used as an intermediate in pesticide production. The substance reacts with methyl isocyanate to produce an aldicarb formulation (Aldicarb, Temik). This reaction is conducted in a sealed system to prevent exposure to the methyl isocyanate.

Aldicarb is primarily used by industrial workers experienced in the handling of substances of greater toxicity. Significant airborne levels of the substance should not occur due to its low vapour pressure (< 0.1 mm Hg). Honeywell has established PEL of 10 ppm (54.3 mg/m$^{3)}$ as an 8 hour TWA.

As exposures are very low (relative to the Honeywell PEL of 10 ppm), monitoring at the production site has been conducted infrequently. The results from this monitoring confirm that exposures are low.

Date	Personal (#)	Area (#)
Aug.-Nov 1977	<0.45 ppm (8)	<0.1 ppm (16)
Feb-April 1978	≤0.29 ppm (8)	
Sept 1978	≤0.04 ppm (2)	≤0.02 ppm (5)
Oct. 1978	≤0.05 ppm (3)	≤0.12 ppm (4)
May 1985	0.05 ppm (1)	0.01 ppm (1)

2.3.2 Consumer Exposure

No data are available.

3 HUMAN HEALTH HAZARDS

3.1 Effects on Human Health

3.1.1 Toxicokinetics, Metabolism and Distribution

No data are available.

3.1.2 Acute Toxicity

Studies in Animals

Inhalation

In an inhalation study by Toxigenics, Inc. (1984) rats were exposed for 4 hours whole-body to aerosols at concentrations of 0.67, 1.12, 2.55 and 4.91 mg/L. Mortality occurred at all dose levels tested. The LC_{50} was calculated to be 1230 mg/m^3. In a limit acute whole body inhalation test (Food and Drug Research Laboratories, 1974) rats were exposed to a single concentration of 2 mg/L of the substance for 1 hour. No deaths occurred and therefore the NOEC was > 2 mg/L. In another limit

inhalation test rats were exposed 8 hours whole body to 92.7% and 99.25% of the substance (saturated), separately. No deaths occurred at these levels of exposure.

Dermal

Intact skins of rats were exposed for 24 hours to the substance at dose levels of 0.02, 0.2, 0.43, 0.928 and 2.0 g/kg (20, 200, 430, 928 and 2000 mg/kg,) (Food and Drug Research Laboratories Inc., 1975). Mortality occurred in all groups except at 928 mg/kg. The LD_{50} was calculated to be 1900 mg a.s./kg. In another study rabbits were exposed for 24 hours under occluded conditions to the substance at a dose of 0.2 mL/kg. As mortality occurred at this dose level, the LD_{100} was 0.2 mL/kg (210 mg/kg).

Oral

In the Carnegie-Mellon Institute study (1971), non-fasted rats were exposed via acute oral intubation to dose levels of 0.5, 1.0, 2.0 mL/kg . Mortality occurred at all dose levels. The LD_{50} was calculated to be 0.71 mL/kg (746 mg/kg). In two other studies (Carnegie-Mellon Institute, 1974 and Carnegie-Mellon Institute, 1965) non-fasted rats were exposed via intubation and gavage, respectively. The LD_{50} were 0.707 mL/kg (742 mg/kg) and 0.77 mL/kg (809 mg/kg), respectively. Rats were exposed to the substance in corn oil via intubation (Carnegie-Mellon Institute, 1970). The LD_{50} of this study was 2380 mg/kg.

Other Routes of Exposure

In the Carnegie-Mellon Institute study (1965), mice were exposed to a single dose of the substance (1% aqueous solution) via i.p. injection. All animals died within 24 hours and therefore the LD_{50} was considered to be < 100 mg/kg (< 1 mg a.s./kg).

Conclusion

Table 1 Acute toxicity studies with ADO.

Route	Species	Doses	LD_{50}/LC_{50}
Oral gavage	Rat, Wistar	0.5, 1.0 and 2.0 mL/kg	0.71 mL/kg (~ 746 mg/kg)
Oral gavage	Rat, Harlan-Wistar	Not specified	0.707 mL/kg (~ 742 mg/kg)
Oral gavage	Rat, Wistar	0.5 and 1.0 mL/kg	0.77 mL/kg (~ 809 mg/kg)
Oral gavage	Rat, Harlan-Wistar	Not specified, substance administered in corn oil	2380 mg/kg
Inhalation, whole body; 4 hour	Rat, Crl:CD(SD) BR	0.67, 1.12, 2.55, 4.91 mg/L (aerosol) purity onknown	1230 mg/m^3
Inhalation, whole body; 1h	Rat, Sherman-Wistar	2 mg/L purity onknown	> 2 mg/L
Inhalation, whole body; 8h	Rat, Wistar	Saturated vapour	No deaths at saturated vapour
Dermal	Rabbit, albino	20, 200, 430, 928 and 2000 mg/kg purity onknown	1900 mg/kg
Dermal	Rabbit, albino/New Zealand	0.2 mL/kg purity onknown	0.2 mL/kg (210 mg/kg)
i.p.	Mouse, albino	100 mg/kg	< 1 mg a.s./kg (LD_{100}: 1 mg a.s./kg)

3.1.3 Irritation

Skin Irritation

Studies in Animals

In the skin irritation test with rabbits (Carnegie-Mellon Institute, 1965) ADO was found to produce moderate erythema.

Eye Irritation

Studies in Animals

Carnegie-Mellon Institute (1965) reported that rabbits exposed to 0.005 mL undiluted ADO, 0.5 mL of 15% ADO in propylene glycol or 0.5 mL 5% ADO in propylene glycol all showed corneal necrosis and in some cases eyelid irritation was also noted.

Conclusion

Based on the studies ADO is considered to be moderately irritating to the skin and corrosive to the eyes.

3.1.4 Sensitisation

No data are available.

3.1.5 Repeated Dose Toxicity

Studies in Animals

Oral

In the sub-chronic repeated dose study of Hazleton Laboratories Inc. (1976), 25 rats per sex per dose were exposed for 13 weeks to substance dose levels of 5, 25 and 125 mg/kg via the diet (equal to 4.8, 23.8 and 118.5 mg/kg for males and 4.8, 24.3 and 120.2 mg/kg for females),. No animals were found dead in any dose level groups. A reduced bodyweight gain was observed in high dose females; however this was associated with reduced food intake. No treatment-related clinical signs, changes in haematology parameters and organ weigths were observed. Also no microscopical treatment related findings were observed after necropsy. The NOEL was considered to be 120.2 mg/kg (LOEL > 120.2 mg/kg) by the authors assuming that the observed reduction in female body weights at this level was a result of reduced food consumption rather than a direct toxic effect of the substance. However, the lower increase in body weight must be taken into account and therefore the NOEL and LOEL should be 24.3 mg/kg bw/day and 120.2 mg/kg bw/day, respectively.

Another study (Carnegie-Mellon Institute, 1974) described the effects of oral feed exposure of 5 rats per sex per dose at nominal dose levels of 250, 500 and 1000 mg/kg (study 1; attained dose levels 243, 409 and 728) and 31.25, 62.5 and 125 mg/kg (study 2; attained dose levels 27.6, 57.9 and 121 mg/kg). Reduced body weights were found for males ($\geq$ 57.9 mg/kg) and females ($\geq$ 121 mg/kg). Food consumption was reduced at the higher dose levels. No mortality occurred. No other effects were noted. Based on the effects on body weight gain the NOEL was considered to be 27.6 mg/kg (LOEL: 57.9 mg/kg).

In the one-generation reproduction study by Wolterbeek and Waalkens-Berendsen (2005), 28 male and 28 female rats per dose were exposed to dose levels of 0, 5, 25 and 75 mg a.s./kg bw/day by gavage. Mean body weight change was statistically significantly changed in the high dose male group. The observed decrease in food consumption of male and female rats was considered to be related to the administration by gavage. In the high dose groups effects on red blood cell variables and white blood cell parameters were observed. Statistically significant increase of the spleen weights and kidney weights was observed in high dose animals. Macroscopic examination revealed increased brown pigment accumulation and increased extramedullary haematopoiesis in the spleen of the high dose animals. In the liver of all treated females and high dose males focal to multifocal Kupfer cells were observed. In addition, slight to moderate increased mitotic activity of the hepatocytes was seen in all treated females. Increased mitotic activity was not observed in the males. Based on the microscopically observed liver effects in females, the NOAEL is considered to be < 5 mg a.s./kg bw/day. The LOAEL is 5 mg a.s./kg bw/day. For reproduction effects of this study see section 3.1.8.

Conclusion

The overall NOAEL for repeated dose toxicity is considered to be < 5 mg a.s./kg bw/day.

3.1.6 Mutagenicity

Studies in Animals

In vitro Studies

Study	Species	Concentration	Result	References
Ames test (plate incorporation)	*Salmonella typhymurium* TA98, TA100, TA1535, TA 1537, TA1538	100, 333, 1000, 3333 and 10000 µg/plate	Negative + and – S9	Rogers-Back *et al* (1988)
Ames test (plate incorporation)	*Salmonella typhymurium* TA98, TA100, TA1535, TA1538	5, 10, 50, 100, 500, 1000 and 5000 µg/plate	Negative + and – S9	Stanford Research Institute (1975)
Mouse lymphoma	L5178Y $tk^{+/-}$ 3.7.2C mouse lymphoma cells	1.1, 1.2, 1.3, 1.4, 1.5, and 1.6 µL/mL	+/- (-S9)[1] - (+S9)	Rogers-Back *et al* (1988)

1 Observed at a dose with cytotoxicity (11% of total growth)

In vivo Studies

No data available.

Conclusion

The mouse lymphoma test is positive at a cytotoxic concentration (11% of total growth). According to OECD 476, equivocal results should be clarified by further testing. In addition, data on chromosomal aberrations should be made available.

3.1.7 Carcinogenicity

No data are available.

3.1.8 Toxicity for Reproduction

Studies in Animals

In the oral repeated dose toxicity study of Hazleton Laboratories Inc. (1974) (see section 3.1.5), the reproductive organs were also examined (nominal dose levels: 5, 25 and 125 mg/kg). No changes in testicular weight were found. Also no effects were reported for the testes or ovaries after microscopic pathological examination. In an oral gavage one-generation reproduction toxicity study (Wolterbeek and Waalkens-Berendsen, 2005) rats were exposed to ADO at doses of 5, 25 and 75 mg a.s./kg bw (purity 98.6-98.8 %) for at least 10 weeks during premating, mating, gestation and lactation. Decreased number of live born pups and an increased number of stillborn pups was observed in the high dose group. Therefore, the NOEL was established to be 25 mg a.s./kg bw

Conclusion

Based on the results of the study of Wolterbeek and Waalkens-Berendsen, 2005, the overall NOEL for developmental toxicity was considered to be 25 mg a.s./kg bw.

3.2 Initial Assessment for Human Health

See conclusions in section 3.1.

4 HAZARDS TO THE ENVIRONMENT

4.1 Aquatic Effects

Acute Toxicity Test Results

Acceptable ecotoxicity data are available for rainbow trout (*Salmo gairdneri)*, bluegill sunfish (*Lepomis macrochirus)*, green fresh alga (*Selenastrum capricornutum*) and the invertebrate *Daphnia magna.* Acute LC_{50}/EC_{50} values have been reported as 28 mg a.s./L, 275 mg a.s./L, 33 mg a.s./L and 343 mg a.s./L, respectively. Based on these values, ADO is considered slightly to moderately toxic to aquatic organisms.

Toxicity to Microorganisms

Concentrations of 500 mg a.s./L or less of ADO have been reported to have no inhibitory effect on the carbon metabolism of activated sludge microorganisms.

4.2 Terrestrial Effects

No data are available.

4.3 Other Environmental Effects

No data are available.

4.4 Initial Assessment for the Environment

See section 3.2.

5 RECOMMENDATIONS

The appropriate log Pow must be made available.

Equivocal results of the mouse lymphoma test should be clarified by further testing. In addition data on chromosomal aberrations should be made available.

A genotoxic response in vitro makes the chemical a candidate for further work; if not, the chemical is currently of low priority for further work.

6 REFERENCES

Allied Chemical Corporation, (1981). Static acute toxicity of aldicarb oxime (ADO) to Bluegill Sunfish, Lepsomis Macrochirus, Report No. MA-13-77-20.

Allied Chemical Corporation, (1981). Static acute toxicity test of aldicarb oxime-Analysis of Aqueous ADO samples,Report No. MA-13- 77-19.

Allied Chemical Corporation, (1981). The acute toxicity of aldicarb oxime (ADO) to the water flea, Daphnia magna, Report No. MA-13-77-22.

Allied Chemical Product Safety Data Sheet for ADO oxime (1981), July 1981.

Allied Corporation, (1981). Microbial toxicity of aldicarb oxime (ADO), Report No. MA-13-77-24.

Allied Corporation, (1981). Static acute toxicity of aldicarb oxime (ADO) to rainbow trout, Salmo gairdneri, Report No. MA-13-77-23.

Allied Corporation, (1982). Static shake flask- CO2 evolution test of aldicarb oxime (ADO) Report No. MA-13-77-30.

Arthur D. Little, Inc (1989). Health and Safety Package for Aldicarb oxime, Feb. 21, 1989.

Arthur D. Little, Inc (1989). Health and Safety Package for Aldicarb oxime, Feb. 21, 1989.Honeywell International Inc.(2000). Material Safety Data Sheet for Aldicarb Oxime, Jan. 27, 2000.

Carnegie- Mellon Institute (1965). Range finding tests on Compound 21786, 2, methyl-2-methylthiopropionaldehyde oxime, Report no. 28-70 (conducted for Union Carbide).

Carnegie-Mellon Institute (1965). Range finding tests on Compound 21786, 2, methyl-2-methylthiopropionaldehyde oxime, Report no. 28-70 (conducted for Union Carbide).

Carnegie-Mellon Institute (1971). Miscellaneous toxicity studies, Report 34-71. Cited in: Carnegie-Mellon Institute (1974) Aldicarb Oxime: Results of Feeding in the Diet for 7 Days, Report 37-94, (conducted for Union Carbide Corporation).

Carnegie-Mellon Institute (1974). Aldicarb Oxime: Results of Feeding in the Diet for 7 Days, Report 37-94, (conducted for Union Carbide Corporation).

Carnegie-Mellon Institute (1976). Miscellaneous toxicity studies, Report no. 37-94 (conducted for Union Carbide).

Carnegie-Mellon Institute, (1970), TEMIK and other materials, Miscellaneous single dose peroral and parenteral LD50 assays and some joint action studies, Report no. 37-94 (conducted for Union Carbide).

Carnegie-Mellon Institute, (1974). Aldicarb Oxime: Results of Feeding in the Diet for 7 Days ,Report 37-94, (conducted for Union Carbide Corporation).

Dijk van NRM, Oldersma H, Kerkdijk H, Verhoef A (2005). Determination of the effect of Aldicarb Oxime (CAS#1646-75-9) on the growth of the fresh water green alga Selenastrum capricornutum, TNO Quality of Life, TNO Report V5993/01, March 30, 2005.

Food and Drug Research Laboratories, (1974). Acute inhalation study of ADO #50-4535-49C, (conducted for Allied Chemical Inc.).

Food and Drug Research Laboratories, Inc., (1975). Acute dermal toxicity study in rabbits, (conducted for Allied Chemical Corporation).

Hazleton Laboratories, Inc. (1976). 13-Week Toxicity Study in Rats, Report 165-168 (conducted for Allied Chemical Corporation.

Honeywell International Inc. (2000). Material Safety Data Sheet for Aldicarb Oxime, Jan. 27, 2000.

Honeywell International Inc.(2000). Material Safety Data Sheet for Aldicarb Oxime, Jan. 27, 2000.

Internal Allied Signal (Honeywell) monitoring report (1995). Blake Wiseman to D. W. Stidham, October 12, 1995.

Rogers-Back AM, Lawlor TE, Cameron TP and Dunkel VC (1988). Genotoxicity of 6 oxime compounds in Salmonella/mammalian-microsome assay and mouse lymphoma TK+/- assay. Mutation Research 204: 149-162.

Stanford Research Institute (SRI) (1975). Microbial mutagenesis assays of Allied Chemical Corporation compounds, report LSC-4192. (conducted for Allied Chemical Corporation).

Toxigenics, Inc, (1984). Four Hour Acute Aerosol Inhalation Toxicity Study in Rats of Aldicarb Oxime. Report 420-1434 (conducted for Union Carbide Corporation).

Verhoef A and Kerkdijk H (2005). Abiotic degradation of Aldicarb Oxime according to OECD guideline 111 – a preliminary test (tier 1). TNO Quality of Life, TNO Report V6088/2.

Wolterbeek APM and Waalkens-Berendsen DH (2005). One-generation reproduction toxicity study with aldicarb oxime (ADO) in rats. TNO Quality of Life, TNO Report V5842_2.

IUCLID

Data Set

Existing Chemical	ID: 1646-75-9
CAS No.	1646-75-9
EINECS Name	2-methyl-2-(methylthio)propionaldehyde oxime
EC No.	216-709-5
Molecular Formula	C5H11NOS

Producer Related Part

Company:	TNO Quality of Life
Creation date:	23-SEP-2005

Substance Related Part

Company:	TNO Quality of Life
Creation date:	23-SEP-2005

Memo:	SIDS ADO (final)
Printing date:	16-JAN-2006
Revision date:	
Date of last Update:	**16-JAN-2006**
Number of Pages:	**35**
Chapter (profile):	Chapter: 1, 2, 3, 4, 5, 6, 7, 8, 10
Reliability (profile):	Reliability: without reliability, 1, 2, 3, 4
Flags (profile):	Flags: without flag, confidential, non confidential, WGK (DE), TA-Luft (DE), Material Safety Dataset, Risk Assessment, Directive 67/548/EEC, SIDS

1.0.1 Applicant and Company Information

Type: manufacturer
Name: other: Honeywell International Inc.
Street: 101 Columbia Road
Town: NJ 07962 Morristown
Country: United States

23-SEP-2005

1.0.2 Location of Production Site, Importer or Formulator

Type: manufacturer
Name of Plant: Hopewell Virginia plant

23-SEP-2005

1.0.3 Identity of Recipients

Name of recip.: unknown

Remark: Aldicarb oxime (ADO) is used as an agricultural intermediate in the production of carbamate pesticides. The substance is sold to one customer who uses it at only one site.

29-NOV-2005

1.0.4 Details on Category/Template

-

1.1.0 Substance Identification

Mol. Formula: C5H11NOS
Mol. Weight: 133

23-SEP-2005

1.1.1 General Substance Information

Purity type: typical for marketed substance
Substance type: organic
Physical status: liquid
Purity: > 99 - % w/w
Colour: clear, colourless

Remark: pH of the substance is 7. The substance has no significant impurities and no additives are present.

23-SEP-2005

1.1.2 Spectra

-

1.2 Synonyms and Tradenames

2-(methylthio)isobutyraldehyde oxime

23-SEP-2005

2-methyl-2-(methylthio)propionaldehyde oxime

23-SEP-2005

2-methyl-2-(methylthio)propionaldoxime

23-SEP-2005

Aldicarb Oxime: ADO

23-SEP-2005

propanal, 2-methyl-2-(methylthio)-, oxime

23-SEP-2005

propionaldehyde,2-methyl-2-(methylthio)-,oxime

23-SEP-2005

Temik oxime

23-SEP-2005

1.3 Impurities

Purity type: other: no significant impurities

06-OCT-2005

1.4 Additives

Purity type: other: None

06-OCT-2005

1.5 Total Quantity

Remark: Total amount of substance produced is 1 to 5 MM lbs/yr.
06-OCT-2005

1.6.1 Labelling

-

1.6.2 Classification

-

1.6.3 Packaging

-

1.7 Use Pattern

Type: industrial
Category: Agricultural industry

Remark: Chemical Intermediate in the production of carbamate pesticides, used only at one site.
06-OCT-2005

1.7.1 Detailed Use Pattern

-

1.7.2 Methods of Manufacture

-

1.8 Regulatory Measures

-

1.8.1 Occupational Exposure Limit Values

Type of limit: other

Remark: The substance is primarily used by industrial workers experienced in the handling of substances of greater toxicity. Significant airborne levels of the substance should not occur due to its low vapor pressure. Honeywell has established PEL of 10 ppm (54.3 mg/m3) as an 8 hour TWA.
19-OCT-2005 (20)

1.8.2 Acceptable Residues Levels

-

1.8.3 Water Pollution

-

1.8.4 Major Accident Hazards

-

1.8.5 Air Pollution

-

1.8.6 Listings e.g. Chemical Inventories

-

1.9.1 Degradation/Transformation Products

-

1.9.2 Components

-

1.10 Source of Exposure

Source of exposure: Human: exposure by production
Exposure to the: Substance

Remark: ADO is produced at only one Honeywell site, for one customer. The synthesis of the product is conducted in a sealed system minimizing employee exposure.

As exposures are very low (relative to the Honeywell PEL of 10 ppm), monitoring at the production site has been conducted infrequently. The results form this monitoring confirm that exposures are low.

Date	Personal (#)	Area (#)
Aug.-Nov 1977	<0.45 ppm (8)	<0.1 ppm (16)
Feb-April 1978	<0.29 ppm (8)	
Sept 1978	<0.04 ppm (2)	<0.02 ppm (5)
Oct. 1978	<0.05 ppm (3)	<0.12 ppm (4)
May 1985	0.05 ppm (1)	0.01 ppm (1)

23-SEP-2005 (21)

1.11 Additional Remarks

-

1.12 Last Literature Search

-

1.13 Reviews

-

2.1 Melting Point

Value: = 21 degree C

Method: other
GLP: no data
Test substance: no data

Reliability: (4) not assignable
23-SEP-2005 (9) (20)

2.2 Boiling Point

Value: = 210 degree C

Method: other
GLP: no data
Test substance: no data

Remark: The susbtance boils with partial decomposition.
Reliability: (4) not assignable
23-SEP-2005 (9) (20)

2.3 Density

Value: = 1.05 g/cm³

Method: other: specific gravity
GLP: no data
Test substance: no data

Reliability: (4) not assignable
23-SEP-2005 (9) (20)

2.3.1 Granulometry

-

2.4 Vapour Pressure

Value: < .1 at 20 degree C

Method: other (measured)
GLP: no data
Test substance: no data

Reliability: (4) not assignable
23-SEP-2005 (9) (20)

2.5 Partition Coefficient

Partition Coeff.: octanol-water
log Pow: ca. 15.1

Method: other (calculated)
GLP: no data
Test substance: no data

Reliability: (4) not assignable
23-SEP-2005 (5)

2.6.1 Solubility in different media

Solubility in: Water
Value: = 2.5 other: wt% at 22 degree C

Method: other
GLP: no data
Test substance: no data

Remark: Henry's Law Constant
Results: 7.12e-007 atm.-m3/mole
Method: calculated from VP: 0.1 mm Hg
Water solubility: 2.5 e-004 ppm
HENRYWIN v3.10
Reliability: (4) not assignable
23-SEP-2005 (20)

2.6.2 Surface Tension

-

2.7 Flash Point

Value: = 118 degree C
Type: open cup

Method: other
GLP: no data
Test substance: no data

Reliability: (4) not assignable
23-SEP-2005 (9) (20)

2.8 Auto Flammability

Value: = 285 degree C

Method: other
GLP: no data
Test substance: no data

Reliability: (4) not assignable
23-SEP-2005 (20)

2.9 Flammability

Result: non flammable

Method: other
GLP: no data
Test substance: no data

Reliability: (4) not assignable
23-SEP-2005 (20)

2.10 Explosive Properties

-

2.11 Oxidizing Properties

-

2.12 Dissociation Constant

-

2.13 Viscosity

-

2.14 Additional Remarks

-

3.1.1 Photodegradation

Type: other

Remark: No data are available.
23-SEP-2005

3.1.2 Stability in Water

Type: abiotic

Method: other: HPLC analysis of saturated solution
GLP: yes
Test substance: no data

Remark: A saturated solution of ADO was prepared by stirring excess ADO in well water for three hours and allowing it to settle for one hour. The supernatant was evaluated by maintaining the solution for 15 days and analyzing by HPLC at periodic intervals.
Result: The substance was stable for at least 15 days
Reliability: (2) valid with restrictions
23-SEP-2005 (3)

Type: abiotic
t1/2 pH4: > 5 day(s) at 50 degree C
t1/2 pH7: > 5 day(s) at 50 degree C
t1/2 pH9: > 5 day(s) at 50 degree C
Deg. products: not measured

Method: OECD Guide-line 111 "Hydrolysis as a Function of pH"
GLP: yes
Test substance: other TS

Method: Aqueous solutions of the test substance in buffer solutions (pH 4.0, 7.0 and 9.0) were kept at 50°C for 5 days. The concentration of the substance was determined at days 0, 1 and 5 using the HPLC. The percentage hydrolysis was determined after 5 days at each pH.
Result: The reproducibilty and repeatability of the analytical method for the measurment of the test substance was determined. The recoveries measured were between 95.9 and 102%. The reproducibility (RSD in the measured concentration of 5 validation samples) of this method was 0.48% for pH 4.0, 1.6% for pH 7.0 and 0.82% for pH 9.0.

The % hydrolysis of ADO measured after incubation at 50°C after 5 days was -1.3%, 4/6% and 7.6% at pH 4.0, 7.0 and 9.0, respectively. Since the % hydrolysis of ADO in all buffer solutions is less than 10 after incubation at 50°C for 5 days, ADO is considered to be hydrolytically stable at pH 4.0, 7.0 and 9.0.

Test substance: The test substance tested has a purity of 98.8%.
Reliability: (1) valid without restriction
16-JAN-2006 (1)

3.1.3 Stability in Soil

-

3.2.1 Monitoring Data (Environment)

Type of measurement: other

Remark: Model AopWin v1.91
Hydroxyl Radical Reaction:
Overall OH Rate Constant = 4.3506 e-12 cm3/molecule-sec
Half-life = 2.459 days (12-hr day; 1.5 e6 OH/cm3)

Soil Adsorption (PCKOCWIN v1.66):
Koc = 380.8 log Koc = 2.581
Reliability: (1) valid without restriction
23-SEP-2005

3.2.2 Field Studies

-

3.3.1 Transport between Environmental Compartments

Type: fugacity model level III
Method: other

Remark: Input data:
Water solubility 25,000 mg/L
Vapor pressure: 0.1 mm Hg
Log Kow = 15.1
Boiling Point: 210°C
Melting point: 21°C

Level III Fugacity Model:

	Percent	Half-life	Emissions
Air	1.92%	59 hr.	1000 kg/hr
Water	6.97%	360 hr.	1000 kg/hr
Soil	29.2%	360 hr.	1000 kg/hr
Sediment	61.9%	1.44 e3	0

Persistence Time: 669 hr.
Reliability: (1) valid without restriction
23-SEP-2005

3.3.2 Distribution

-

3.4 Mode of Degradation in Actual Use

-

3.5 Biodegradation

Result: under test conditions no biodegradation observed

Method: other: Static shake flask-CO2 evolution
GLP: yes
Test substance: other TS

Method: An acclimated mixed culture inoculum derived from activated sludge and soil was exposed to 10 mg/L organic carbon of ADO for 28 days at 23 degree C (SD 4 degree C). Evolution of CO2 and removal of soluble organic carbon were evaluated.
Result: Cumulative 28 day percentage CO2 evolutions was 2.62% and cumulative 28 day soluble organic carbon removal was <1.0%.
Test substance: Purity: 97.4%
Reliability: (1) valid without restriction
29-NOV-2005 (8)

3.6 BOD5, COD or BOD5/COD Ratio

-

3.7 Bioaccumulation

Species: other

Remark: There are no data available. The given LogPOw value (15.1) is not considered reliable and the substance is not biodegradable. A reliable LogPow must be made available.
29-NOV-2005

3.8 Additional Remarks

-

AQUATIC ORGANISMS

4.1 Acute/Prolonged Toxicity to Fish

Type: static
Species: Lepomis macrochirus (Fish, fresh water)
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:** no data
LC50: = 275 calculated
Limit Test: no

Method: other
GLP: yes
Test substance: other TS

Method: Bluegill sunfish were exposed to five nominal ADO concentrations (66, 102,158,243 and 374 mg/L) for 96 hours at 22 degree C under static test conditions.
Result: The acute lethality threshold concentration at 96 hours was between 102 and 158 mg/L. An NOEL was < 66 mg/L.
Test substance: Purity: 97.4%
Reliability: (1) valid without restriction
29-NOV-2005 (2)

Type: static
Species: Salmo gairdneri (Fish, estuary, fresh water)
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:** no data
LC50: = 28 calculated
NOEL : = 16 measured/nominal
Limit Test: no

Method: other
GLP: yes
Test substance: other TS

Method: Rainbow trout were exposed to five nominal ADO concentrations (16, 27, 44, 75 and 125 mg/L) for 96 hours at 12 degree C under static test conditions.
Result: The acute lethality threshold concentration at 96 hours was between 16 and 27 mg/L.
Test substance: Purity: 97.4%
Reliability: (1) valid without restriction
27-OCT-2005 (7)

23-SEP-2005

4.2 Acute Toxicity to Aquatic Invertebrates

Type: static
Species: Daphnia magna (Crustacea)
Exposure period: 48 hour(s)
Unit: mg/l **Analytical monitoring:** no data
NOEC: = 137 measured/nominal
EC50: = 343 calculated
Limit Test: no

Method: other
GLP: yes
Test substance: other TS

Method: Daphnids were exposed to five nominal ADO concentrations (96, 137, 196, 280 and 400 mg/L) for 48 hours under static test conditions.
Test substance: Purity: 97.4%
Reliability: (1) valid without restriction
29-NOV-2005 (4)

4.3 Toxicity to Aquatic Plants e.g. Algae

Species: Selenastrum capricornutum (Algae)
Endpoint: growth rate
Exposure period: 72 hour(s)
Unit: mg/l **Analytical monitoring:** yes
Limit Test: no

Method: Directive 92/69/EEC, C.3
Year: 1992
GLP: yes
Test substance: other TS

Method: Concentrations tested were: 10, 33, 58, 103, 329 mg/L (nominal).
Result: NOEC: 33 mg/L
NEC: 14.1 mg/L (95% confid.8.1-20.2)
ErC10: 140 mg/L
ErC50: > 329 mg/L (95% confid.640-930;extrapolated 770)
ErC90: > 329 mg/L (extrapolated: 4100)
EbC10: 27 mg/L (range 10-33)
EbC50: 180 mg/L (range 100-329)
EbC90: > 329 mg/L
Reliability: (1) valid without restriction
06-OCT-2005 (16)

4.4 Toxicity to Microorganisms e.g. Bacteria

Type: other
Species: activated sludge
Exposure period: 5 hour(s)
Unit: mg/l **Analytical monitoring:** no data
IC50 : > 5000 measured/nominal

Method: other: STM, ESL-009, Microbial Toxicity (IC50)-Lockhart method, respiration rate
GLP: yes
Test substance: other TS

Method: An activated sludge inoculum was exposed to four nominal ADO concentrations (5, 50, 500 and 5000 mg/L) at 27 degree C.
Result: Concentrations of ADO of 500 mg/L or less had no inhibitory effect on microbial metabolism. Approximately 20% of microbial metabolism as measured by 14CO2 evolution was observed at 5000 mg/L. Therefore, an IC50 was not reached.
Test substance: Purity: 97.4%
Reliability: (1) valid without restriction
06-OCT-2005 (6)

4.5 Chronic Toxicity to Aquatic Organisms

4.5.1 Chronic Toxicity to Fish

-

4.5.2 Chronic Toxicity to Aquatic Invertebrates

-

TERRESTRIAL ORGANISMS

4.6.1 Toxicity to Sediment Dwelling Organisms

-

4.6.2 Toxicity to Terrestrial Plants

-

4.6.3 Toxicity to Soil Dwelling Organisms

-

4.6.4 Toxicity to other Non-Mamm. Terrestrial Species

-

4.7 Biological Effects Monitoring

-

4.8 Biotransformation and Kinetics

-

4.9 Additional Remarks

-

5.0 Toxicokinetics, Metabolism and Distribution

-

5.1 Acute Toxicity

5.1.1 Acute Oral Toxicity

Type: LD50
Species: rat
Strain: Wistar
Sex: male
No. of Animals: 15
Vehicle: no data
Doses: 2.0, 1.0, 0.5 mL/kg
Value: = 746 mg/kg bw

Method: other
GLP: no
Test substance: no data

Result: Mortality was 5/5, 3/5 and 2/5, respectively. Rats became prostrate with heavy breathing 10 minutes post dose. Deaths occurred within 30 minutes at the two highest dose levels and within 3 hours at the low dose.
Reliability: (2) valid with restrictions
23-SEP-2005 (11)

Type: LD50
Species: rat
Strain: other: Harlan-Wistar
Sex: no data
Vehicle: no data
Doses: 0.707 mL/kg (742 mg/kg)
Value: = 742 mg/kg bw

Method: other
GLP: no
Test substance: no data

Method: Undiluted sample of ADO designated for 7-day feeding study (see below) was tested for acute peroral intubation toxicity using nonfasted rats weighing 98-120 grams. No additional details were given in the report. Dose levels were not specified in the report.
Result: Rats were reported to have unsteady gait and piloerection, were prostrate within 5 minutes, and death, when it occurred, was within 0.5 to 3 hours.
Reliability: (2) valid with restrictions
23-SEP-2005 (12)

Type: LD50
Species: rat
Strain: Wistar
Sex: male
No. of Animals: 10
Vehicle: no data
Doses: 1.0, 0.5 mL/kg
Value: = 809 mg/kg bw

Method: other
GLP: no
Test substance: no data

Method: Undiluted sample of ADO was administered to groups of 5 male rats weighing 90-120 grams at dose levels of 1.0 and 0.5 mL/kg.
Result: Four of five animals died at the high dose while no deaths occurred at the low dose. High dose animals were observed to be prostrate within minutes after dosing with death occurring soon after. Gross pathological examination (apparently of the animals that died) found congestion throughout the thoracic and abdominal viscera. The LD50 was set at 0.77 mL/kg (809 mg/kg).
Reliability: (2) valid with restrictions
29-NOV-2005 (10)

Type: LD50
Species: rat
Strain: other: Harlan-Wistar
Sex: male
Vehicle: other: corn oil
Doses: 2380 mg/kg
Value: = 2380 mg/kg bw

Method: other
GLP: no
Test substance: no data

Method: Male rats (number not specified) weighing 90-120 grams were dosed by gavage with ADO in corn oil.
Result: LD50 calculated by the moving average method is reported. Higher LD50 than reported for undiluted ADO likely due to reduced absorption from the oil vehicle related to high solubility in oil as shown by partition coefficient for ADO.
Reliability: (2) valid with restrictions
23-SEP-2005 (14)

5.1.2 Acute Inhalation Toxicity

Type: LC50
Species: rat
Strain: other: Crl:CD (SD) BR
Sex: male/female
No. of Animals: 40
Vehicle: no data
Doses: 0.67, 1.12, 2.55, 4.91 mg/L
Exposure time: 4 hour(s)
Value: = 1230 mg/m³

Method: other
GLP: yes
Test substance: no data

Method: Four groups of 5 male and 5 female rats received whole-body inhalation exposures to aerosol atmospheres of ADO having a mass median diameter of 2.85 micrometers and geometric standard deviation of 1.93. Gravimetric time-weighted average concentrations were 0.67, 1.12, 2.55 and 4.91 mg/L. The animals were followed for 14 days following the exposure.
Remark: Exposures of the high and low exposure groups were for 3.5 hours rather than 4 hours due to insufficient test material. Study director recalculated original LC50 of 1,560 mg/m3 assuming 2 and 1 additional deaths would have occurred in the high and low exposure groups , respectively, with an additional 30 min. of exposure.
Result: Mortality occurred at all exposure levels tested. Females were slightly more sensitive than males. Major clinical signs included prostration, ataxia, tremors, irregular breathing, salivation and lacrimation. Animals dying exhibited gross abnormalities primarily of the lungs (red discoloration).
Reliability: (2) valid with restrictions
23-SEP-2005 (24)

Type: other: LC50 limit test
Species: rat
Strain: other: Sherman-Wistar
Sex: no data
No. of Animals: 10
Vehicle: no data
Doses: 2 mg/L
Exposure time: 1 hour(s)
Value: > 2 mg/l

Method: other
GLP: no
Test substance: no data

Method: Acute, whole body inhalation. Performed according to criteria specified in Paragraph 191.1 (c) (2) and (f) (2) of the Final Order, Enforcement Regulations, Federal Register, vol 26, no 155, p. 7336, 12 August, 1961).

Ten rats (sex not specified) with an average weight of 285 grams were exposed to ADO for one hour in a 72 liter glass chamber. Air flow was 10 L/min. ADO was generated as a fine aerosol. Nominal concentration was 2 mg/L.

Result: No deaths occurred. Animals appeared docile and stressed immediately after the exposure with full recovery in 24 hours. No other information given in this one page report.

Reliability: (2) valid with restrictions

23-SEP-2005 (17)

Type: other
Species: rat
Strain: Wistar
Sex: no data
No. of Animals: 12
Vehicle: no data
Doses: saturated vapour
Exposure time: 8 hour(s)

Method: other
GLP: no
Test substance: other TS

Method: Saturated vapor was generated by spreading 50 grams of chemical over 200 cm2 area on a shallow tray placed near the top of a 120-liter glass chamber which was subsequently sealed for at least 16 hours with intermittent agitation with a fan. Rats were introduced into the chamber in a gasketed drawer-type cage designed and operated to minimize vapor loss (method described in earlier report from this lab, assumed method was unchanged for this study). Each of the two samples ADO were tested separately. In each study, 6 animals were exposed to the saturated vapor for 8 hours.

Result: The ADO sample of 92.7% purity caused no mortality but produced the following signs of toxicity: eyes closed within 30 minutes, lacrimation within 60 minutes, slight coordination loss within 90 minutes. Signs were no longer present after 4 hours of the 8 hour exposure. The ADO sample of 99.25% purity caused no deaths but produced signs of closed eyes within 30 minutes, slight gasping within 60 minutes, slight coordination loss within 90 minutes. Signs were no longer present after 4 hours of the 8 hour exposure. The report concludes that the signs of toxicity observed may have been due to the presence of impurities that gradually reduced in concentration either through loss or chemical reactions during the course of the exposure.

Test substance: Purity (2 samples) : 92.7% and 99.25%

Reliability: (3) invalid

29-NOV-2005 (13)

23-SEP-2005

5.1.3 Acute Dermal Toxicity

Type: LD50
Species: rabbit
Strain: other: albino
Sex: no data
No. of Animals: 25
Vehicle: no data
Doses: 0.02, 0.2, 0.43, 0.928, 2.0 g/kg
Value: = 1900 mg/kg bw

Method: other: 16 CFR 1500.40
GLP: no
Test substance: no data

Result: Mortality occurred in all groups except at 0.928 mg/kg. The dose response was "U-shaped" (2/5, 1/5, 1/5, 0/5 and 3/5, respectively). No gross pathological effects were observed at necropsy. No additional information is provided in the single page report.
Reliability: (2) valid with restrictions
23-SEP-2005 (18)

Type: other: limit test
Species: rabbit
Strain: New Zealand white
Sex: male
No. of Animals: 4
Vehicle: other: none
Doses: 210 mg/kg (0.2 mL/kg)
Value: = 210 mg/kg bw

Method: other
GLP: no
Test substance: no data

Method: Four male rabbits were exposed dermally to ADO at a dose of 0.2 mL/kg for 24 hours under Vinylite covering (occlusive).
Result: Mortality occurred in one of the rabbits (25% of the animals exposed). No signs or symptoms were reported. Necropsy was not performed on the dead rabbit because of autolysis.
Reliability: (2) valid with restrictions
19-OCT-2005 (10)

5.1.4 Acute Toxicity, other Routes

Type: LD50
Species: mouse
Strain: other: albino
Sex: male
No. of Animals: 5
Vehicle: water
Doses: 100 mg/kg
Route of admin.: i.v.
Exposure time: 24 hour(s)
Value: < 100 mg/kg bw

Method: other: range finding study
GLP: no
Test substance: no data

Method: 5 male mice weighing 24 to 28 grams were injected with ADO as a 1% aqueous solution.
Result: All of the animals died within 24 hours of the injection. Reported signs included marked depression and gasping. Eye and pinna reflexes appeared normal.
Reliability: (3) invalid
19-OCT-2005 (10)

5.2 Corrosiveness and Irritation

5.2.1 Skin Irritation

Species: rabbit
Concentration: undiluted
Exposure: Occlusive
Exposure Time: no data
No. of Animals: 5
Vehicle: other: none
Result: moderately irritating

Method: other
GLP: no
Test substance: no data

Method: The substance was applied undiluted to the clipped intact skin of the belly of 5 rabbits. Exposure was not occluded (uncovered).
Result: ADO produced moderate erythema on 3 animals and moderate to marked capillary injection on 2 others. Test scored as grade 4 based on a ten point system.
Reliability: (2) valid with restrictions
27-OCT-2005 (10)

5.2.2 Eye Irritation

Species: rabbit
Concentration: undiluted
Dose: other
Exposure Time: unspecified
No. of Animals: 5
Vehicle: other: propylene glycol
Result: highly corrosive

Method: other
GLP: no
Test substance: no data

Method: Single exposure of undiluted ADO (0.005 mL) or 0.5 mL of a 5% or 15% ADO in propylene glycol was introduced into conjunctival sac. Observed one hour and 24 hours after exposure. Total number of animals used not specified.
Result: Undiluted ADO (0.005 mL) or 0.5 mL of a 15% ADO in propylene glycol caused moderately severe corneal necrosis. 5% ADO caused no injury in 2 eyes and only a trace of diffuse corneal necrosis in a third. Some eyelid irritation was also noted. Test scored as grade 8 based on a ten point system.
Reliability: (2) valid with restrictions
19-OCT-2005 (10)

23-SEP-2005

5.3 Sensitization

Type: other

Remark: No data available.
23-SEP-2005

5.4 Repeated Dose Toxicity

Type: Sub-chronic
Species: rat **Sex:** male/female
Strain: Crj: CD(SD)
Route of administration: oral feed
Exposure period: 13 weeks
Frequency of treatment: continuous
Doses: 5, 25, 125 mg/kg
Control Group: yes
NOAEL: = 120.2 mg/kg
LOAEL: > 120.2 mg/kg

Method: other
GLP: no
Test substance: no data

Method: Twenty five rats per sex per group were administered ADO for thirteen weeks in feed at target levels of 5, 25, and 125 mg/kg (nominal).
Attained dose: 118.5, 23.8, 4.8 mg/kg (males)
120.2, 24.3, 4.8 mg/kg (females)

Result: No mortality occurred in the study. ADO caused a depression in body weight gain in high-dose females from weeks 3 through 13 of the study. This was associated with a decrease in food consumption. No other signs of toxicity including mortality, clinical signs, changes in hematology or organ weights or gross or microscopic pathology were associated with ADO administration. The N(L)OEL was established assuming that the depression of body weights in females at the highest dose level was a result of reduced food consumption and not a direct toxic effect of ADO.

Reliability: (1) valid without restriction
19-OCT-2005 (19)

Type: Sub-acute
Species: rat **Sex:** male/female
Strain: other: Harlan-Wistar
Route of administration: oral feed
Exposure period: 7 days
Frequency of treatment: continuous
Doses: 250, 500, 1000 mg/kg (study 1); 31.25, 62.5, 125 mg/kg (study 2)
Control Group: yes
NOAEL: = 27.6 mg/kg
LOAEL: = 57.9 mg/kg

Method: other
GLP: no
Test substance: no data

Method: Five rats per group per sex were administered ADO in diet at daily target doses ranging from 31.25 to 1000 mg/kg for 7 days (nominal). Attained dose: 728, 409, 243, 121, 57.9 and 27.6 mg/kg.
Remark: The report describes two separate studies. The initial study was conducted at the higher dose levels followed by a second study at lower dose levels. Parameters examined included mortality, food consumption, bodyweights, and liver and kidney weights.
Result: Lower body weight gains than controls at dose levels at or above 57.9 mg/kg for males and 121 mg/kg for females were observed. The degree of the effect on body weight gains was dose-related, being only slight and transient at the lower dose levels. Food consumption was reduced at the higher dose levels. No deaths occurred. Weights (relative to body weight) of the liver and kidneys were not significantly affected.
Reliability: (2) valid with restrictions
23-SEP-2005 (15)

5.5 Genetic Toxicity 'in Vitro'

Type: Ames test
System of testing: Salmonella typhimurium strains TA98, TA100, TA1535, TA1537 and TA1538
Concentration: 100, 333, 1,000, 3,333, and 10,000 mg/plate
Cytotoxic Concentration: no data
Metabolic activation: with and without
Result: negative

Method: other
GLP: yes
Test substance: no data

Method: Plate incorporation method was used. A solvent control (DMSO) and positive controls were included. The concentrations were tested in triplicate. Doses were selected from a range finding study. Metabolic activation was obtained from Arochlor-

induced rat (F-344) and hamsters (Syrian golden).
Reliability: (1) valid without restriction
23-SEP-2005 (22)

Type: Ames test
System of testing: Salmonella typhimurium strains TA98, TA100, TA1535 and TA1538
Concentration: 5, 10, 50, 100, 500, 1,000 and 5,000 mg/plate
Cytotoxic Concentration: 5000 mg/plate
Metabolic activation: with and without
Result: negative

Method: other
GLP: no
Test substance: no data

Method: Plate incorporation method was used. No replicate performed. Concurrent positive control was reported. Metabolic activation used was obtained from Arochlor induced rats.
Reliability: (2) valid with restrictions
19-OCT-2005 (23)

Type: Mouse lymphoma assay
System of testing: L5178Y tk+/- 3.7.2C mouse lymphoma cells
Concentration: 1.1, 1.2, 1.3, 1.4, 1.5,and 1.6 microlitre/mL
Cytotoxic Concentration: 1.6 microlitre/mL
Metabolic activation: with and without
Result: ambiguous

Method: other
GLP: yes
Test substance: no data

Method: Method of Clive and Spector. Doses selected from range finding study. Solvent and positive controls utilized. Study run in duplicate. Metabolic activation was obtained from Aroclor induced F344 rats.
Result: Equivocal result without metabolic activation. A greater than 2-fold increase in mutant frequency was noted only at the highest dose of 1.6 mL/mL which produced only 11% total growth. There was no clear dose-response with the curve being relatively flat. ADO was not mutagenic with metabolic activation.
Reliability: (1) valid without restriction
23-SEP-2005 (22)

5.6 Genetic Toxicity 'in Vivo'

-

5.7 Carcinogenicity

-

5.8.1 Toxicity to Fertility

-

5.8.2 Developmental Toxicity/Teratogenicity

-

5.8.3 Toxicity to Reproduction, Other Studies

Type: other: sub-chronic reproduction study
In Vitro/in vivo: In vivo
Species: rat
Strain: Crj: CD(SD) **Sex:** male/female
Route of administration: oral feed
Exposure period: 13 weeks
Frequency of treatment: continuous
Duration of test: 13 weeks
Doses: 5, 25, 125 mg/kg (nominal) Attained dose:
118.5, 23.8, 4.8 mg/kg (males)
120.2, 24.3, 4.8 mg/kg (females)

Control Group: yes
Result: No changes in testicular weight or microscopic pathology of the testes or ovaries were observed.

Method: other
GLP: no
Test substance: no data

Remark: Well designed subchronic study. Criteria evaluated included testes weight and gross and microscopic pathology of the testes and ovaries).
Reliability: (2) valid with restrictions
19-OCT-2005 (19)

Type: other: one-generation reproduciton study
In Vitro/in vivo: In vivo
Species: rat
Strain: other: Wistar outbred(Crl:(WI)WU BR) **Sex:** male/female
Route of administration: gavage
Exposure period: at least 10 weeks (premating, mating, gestation and lactation period).
Frequency of treatment: daily
Doses: 5, 25 and 75 mg/kg bw
Control Group: yes
Result: Decreased number of live born pups, increased number of stillborn pups observed in the high dose groups are the basis for the LOAEL of 25 mg/kg bw and the NOAEL 5 mg/kg bw.

Method: other: OECD 415 and 416
Year: 1995
GLP: yes
Test substance: other TS

Result: Except or decreased activity and/or sedation of the high dose animals, no treatment related clinical findings were observed.
Statistically significant decrease in food consumption in high dose animals and mid dose females during the first week of the study was considered to be related to the administration of the test substance.
Fertility or reproductive performance of the male and female animals and the estrus cycle of the females was not affected.
An increase, not statistically significant, in the number of litters with stillborn pups was observed in the high dose groups. This effect was considered treatment related.
No other effects were observed on litter size, number of stillborn-, missing- and dead pups during lactation period and on the sex ratio, pup abnormalities or pup weight during lactation. Macroscopic observations, absolute or relative organ weights (brain, spleen and thymus) did not reveal treatment related findings.
Effects on red blood cell variables and on total white blood cell parameters were observed in high dose group animals.
Gross examination of the parental animals at necropsy did not reveal any treatment-related effect.
Microscopic examination of the organs and tissues of parental animals revealed treatment-related histopathological changes in spleen (high dose group animals) and liver (low-, mid- and high dose females and high-dose males).
Test substance: Purity: 98.6-98.8 %
Reliability: (1) valid without restriction
27-OCT-2005 (25)

23-SEP-2005

5.9 Specific Investigations

-

5.10 Exposure Experience

-

5.11 Additional Remarks

-

6.1 Analytical Methods

-

6.2 Detection and Identification

-

7.1 Function

-

7.2 Effects on Organisms to be Controlled

-

7.3 Organisms to be Protected

-

7.4 User

-

7.5 Resistance

-

8.1 Methods Handling and Storing

-

8.2 Fire Guidance

-

8.3 Emergency Measures

-

8.4 Possib. of Rendering Subst. Harmless

-

8.5 Waste Management

-

8.6 Side-effects Detection

-

8.7 Substance Registered as Dangerous for Ground Water

-

8.8 Reactivity Towards Container Material

-

(1) Abiotic degradation of Aldicarb oxime according to OECD guideline 111 - a preliminary test (Tier 1). TNO Quality of Life, TNO report V6088/2, April 7, 2005.

(2) Allied Chemical Corporation, (1981). Static acute toxicity of aldicarb oxime (ADO) to Bluegill Sunfish, Lepsomis Macrochirus, Report No. MA-13-77-20.

(3) Allied Chemical Corporation, (1981). Static acute toxicity test of aldicarb oxime-Analysis of Aqueous ADO samples ,Report No. MA-13- 77-19.

(4) Allied Chemical Corporation, (1981). The acute toxicity of aldicarb oxime (ADO) to the water flea, Daphnia magna, Report No. MA-13-77-22.

(5) Allied Chemical Product Safety Data Sheet for ADO oxime (1981), July 1981.

(6) Allied Corporation, (1981). Microbial toxicity of aldicarb oxime (ADO), Report No. MA-13-77-24.

(7) Allied Corporation, (1981). Static acute toxicity of aldicarb oxime (ADO) to rainbow trout, Salmo gairdneri, Report No. MA-13-77-23.

(8) Allied Corporation, (1982). Static shake flask- CO2 evolution test of aldicarb oxime (ADO) Report No. MA-13-77-30.

(9) Arthur D. Little, Inc (1989). Health and Safety Package for Aldicarb oxime, Feb. 21, 1989.

(10) Carnegie- Mellon Institute (1965). Range finding tests on Compound 21786, 2, methyl-2-methylthiopropionaldehyde oxime, Report no. 28-70 (conducted for Union Carbide).

(11) Carnegie-Mellon Institute (1971). Miscellaneous toxicity studies, Report 34-71. Cited in: Carnegie-Mellon Institute (1974) Aldicarb Oxime: Results of Feeding in the Diet for 7 Days, Report 37-94, (conducted for Union Carbide Corporation).

(12) Carnegie-Mellon Institute (1974). Aldicarb Oxime: Results of Feeding in the Diet for 7 Days, Report 37-94, (conducted for Union Carbide Corporation).

(13) Carnegie-Mellon Institute (1976). Miscellaneous toxicity studies, Report no. 37-94 (conducted for Union Carbide).

(14) Carnegie-Mellon Institute, (1970), TEMIK and other materials, Miscellaneous single dose peroral and parenteral LD50 assays and some joint action studies, Report no. 37-94 (conducted for Union Carbide).

(15) Carnegie-Mellon Institute, (1974). Aldicarb Oxime: Results of Feeding in the Diet for 7 Days ,Report 37-94, (conducted for Union Carbide Corporation).

(16) Dijk van NRM, Oldersma H, Kerkdijk H, Verhoef A (2005). Determination of the effect of Aldicarb Oxime (CAS# 1646-75-9) on the growth of the fresh water green alga Selenastrum capricornutum, TNO Quality of Life, TNO Report V5993/01, March 30, 2005.

(17) Food and Drug Research Laboratories, (1974). Acute inhalation study of ADO #50-4535-49C, (conducted for Allied Chemical Inc.).

(18) Food and Drug Research Laboratories, Inc., (1975). Acute dermal toxicity study in rabbits, (conducted for Allied Chemical Corporation).

(19) Hazleton Laboratories, Inc. (1976). 13-Week Toxicity Study in Rats, Report 165-168 (conducted for Allied Chemical Corporation.

(20) Honeywell International Inc.(2000). Material Safety Data Sheet for Aldicarb Oxime, Jan. 27, 2000.

(21) Internal Allied Signal (Honeywell) monitoring report (1995). Blake Wiseman to D. W. Stidham, October 12, 1995.

(22) Rogers-Back AM, Lawlor TE, Cameron TP and Dunkel VC (1988). Genotoxicity of 6 oxime compounds in Salmonella/mammalian-microsome assay and mouse lymphoma TK+/- assay. Mutation Research 204: 149-162.

(23) Stanford Research Institute (SRI) (1975). Microbial mutagenesis assays of Allied Chemical Corporation compounds, report LSC-4192. (conducted for Allied Chemical Corporation).

(24) Toxigenics, Inc, (1984). Four Hour Acute Aerosol Inhalation Toxicity Study in Rats of Aldicarb Oxime. Report 420-1434 (conducted for Union Carbide Corporation).

(25) Wolterbeek APM and Waalkens-Berendsen DH (2005). One-generation reproduction toxicity study with aldicarb oxime (ADO) in rats, TNO Quality of Life, TNO Report V5842_2, July 26, 2005.

10.1 End Point Summary

-

10.2 Hazard Summary

-

10.3 Risk Assessment

-

SIDS SUMMARY

2-METHYL-2-METHYLTHIOPROPANOL OXIME (ALDICARB OXIME)

CAS N° 1646-75-9		PROTOCOL	RESULTS
PHYSICO-CHEMICAL			
2.1	Melting point	NO DATA	21°C
2.2	Boiling point	NO DATA	210°C (partial decomposition)
2.3	Density	NO DATA	1.05 g/mL
2.4	Vapour pressure	No data	**< 0.1 mmHg (at 20°C)**
2.5	Partition coefficient	No data	**15.1 unreliable value; a reliable figure must be made available**
2.6	Water solubility	No data	2.5 wt.% (at 22°C)
2.7	Flash point	Open cup	118°C
2.8	Autoflammability	No data	285°C
2.9	Flammabililty	No data	Not flammable
2.10	Henry's Law Constant	HENRYWIN v3.10	$7.12e^{-007}$ atm.-m^3/mole
2.11	Oxidising properties	No data	No data
2.12	Additional remarks	The substance is an organic liquid with a pH of 7.	
ENVIRONMENTAL FATE AND PATHWAY			
3.1.1	Photodegradation	No data available	
3.1.2	Stability in water	In a stability test with a saturated solution, ADO was stable for 15 days. IN AN ABIOTIC DEGRADATION STUDY ACCORDING TO OECD 111, THE HYDROLYSIS OF THE SUBSTANCE AT 50°C AT pH 4.0, 7.0 AND 9.0 WAS MEASURED AT T =0 AND T= 5 DAYS. AS T HYDROLYSIS OF THE TEST SUBSTANCE WAS LESS THAN 10% UNDER ALL TEST CONDITIONS, THE SUBSTANCE WAS CONSIDERED AS HYDROLYTICALLY STABLE UNDER THE TEST CONDITIONS.	
3.2	Monitoring data	Atmospheric oxidation (at 25°C) is expected to occur through photochemically induced hydroxyl radicals reaction; the overall OH rate constant radicals is estimated using Model "AopWin v1.91".; the Overall OH Rate Constant = 4.3506 e $^{-12}$ cm^3/molecule-sec and thealf-life time = 2.459 days (12-hr day; 1.5 e^6 OH/cm^3) Soil adsorption (estimated with PCKOCWIN v1.66) log Koc of 2.581.	
3.3	Transport and Distribution	Persistence time was estimated to be 669 hr. Released substance is estimated to partition in soil>sediment>water>air with the highest concentrations expected in soil (29.2%) and sediment (61.9%) at an emission rate of 1000 kg/hr.	
3.5	Biodegradation	The substance is not biodegradable in a CO_2 evolution test when using a mixed culture of sludge and soil microorganisms. The substance was not readily biodegradable at 50 •C and pH of 4.0, 7.0, and 9.0.	
ECOTOXICOLOGY		**SPECIES**	**PROTOCOL** / **RESULTS**
4.1	Acute/prolonged toxicity to fish	Bluegill sunfish *Lepomis macrochirus* Rainbow trout *Salmo gairdneri*	Static acute LC_{50} 96 hr: 275 mg a.s./L NOEC 96h: 66 mg a.s./L Static acute LC_{50} 96 hr: 28 mg a.s./L NOEC 96h: 16 mg a.s./L
4.2	Acute toxicity to aquatic invertebrates	*Daphnia magna*	Static acute EC_{50} 48 hr: 343 mg a.s./L

4.3	Toxicity to aquatic plants e.g. algae	Fresh water green alga *Selenastrum capricornutum*	OECD 201 and EU C.3 Concentrations: 10, 33, 58, 103, 329 mg a.s./L	NOEC: 33 mg a.s./L (95% c.i.:8.1-20.2) E_rC10: 140 mg a.s./L E_rC50: > 329 mg a.s./L (95% c.i.: 640-930 ; extrapolated 770) E_rC90: > 329 mg a.s./L (extrapolated: 4100) E_bC10: 27 mg a.s./L (range 10-33) E_bC50: 180 mg a.s./L (range 100-329) E_bC90: > 329 mg a.s./L
4.4	Toxicity to bacteria	Activated sludge microorganisms	STM, ESL-009, Microbial Toxicity Lockhart method	IC_{50} 5hr: > 5000 mg a.s./L

MAMMALIAN TOXICOLOGY		**SPECIES**	**PROTOCOL**	**RESULTS**
5.1.1	Acute Oral	Rat, Wistar	Acute intubation, fasted rats purity unknown	LD_{50}: 746 mg/kg
		Rat, Harlan-Wistar	Acute intubation, fasted rats purity unknown	LD_{50}: 742 mg/kg
		Rat, Wistar	Acute intubation, fasted rats gavage with undiluted ADO purity unknown	LD_{50}: 809 mg/kg
		Rat, Harlan-Wistar	Acute intubation, non-fasted rats gavage using corn oil purity unknown	LD_{50}: 2380 mg/kg
5.1.2	Acute Inhalation	Rat, Crl:CD (SD) BR	Acute, whole body aerosol inhalation purity unknown	LC_{50} 4h: 1,230 mg/m^3
		Rat, Sherman-Wistar	Acute, whole body aerosol inhalation (limit test) purity unknown	LC_{50} 1hr: > 2 mg/L
		Rat, Wistar	Static method, whole body exposure (limit)	LC_{50} 8hr: > 50 g a.s./120 L

5.1.3	Acute Dermal	Rabbit, Albino Rabbit, Albino New Zealand	16 CFR 1500.40 intact skin not specified purity unknown	LD_{50}: 1900 mg a.s./kg One out of four animals died at 210 mg/kg
5.1.4	Acute toxicity-other routes	Mouse, Albino	Single dose range finding study (i.p.) purity unknown	LD_{50}: < 100 mg/kg
5.2.1	Skin irritation/corrosion	Rabbit, Albino	Applied on intact skin (not occluded) purity unknown	Moderately irritating
5.2.2	Eye irritation/Corrosion	Rabbit, Albino	Single dose into conjunctival sac purity unknown	Corrosive/severe
5.3	Skin sensitisation	No data available.		
5.4	Repeated dose	Rat, Albino Crl:CD (SD) Rat, Albino Harlan-Wistar **Rats, Wistar outbred** (Crl:(WI)WU BR)	Oral through diet; daily for 13-weeks. Doses: 118.5, 23.8, 4.8 mg/kg (males); 120.2, 24.3, 4.8 mg/kg (females) purity unknown Oral through diet, daily for 7 days. Dose: 728, 409, 243, 121, 57.9 and 27.6 mg/kg purity unknown **Oral gavage, daily for at least 10 weeks (premating, mating, gestation and lactation period) Dose: 5, 25 and 75 mg a.s./kg bw**	LOEL: > 120.2 mg/kg NOEL: 120.2 mg/kg Dose related decrease in body weight at ≥ 57.9mg/kg. Food consumption reduced at the higher dose levels. LOEL: 57.9 mg/kg NOEL: 27.6 mg/kg Microscopically observed liver effects of the low dose female group. LOAEL: 5 mg a.s./kg bw NOAEL: < 5 mg a.s./kg bw

5.5	GENETIC TOXICITY *IN VITRO*	*Salmonella typhymurium* TA98, TA100, TA1535, TA 1537, TA1538	Ames (plate incorporation) Concentration: 100, 333, 1000, 3333 and 10000 µg/plate purity unknown	Not mutagenic with or without metabolic activation.
		Salmonella typhymurium TA98, TA100, TA1535, TA1538	Ames (plate incorporation) Concentration: 5, 10, 50, 100, 500, 1000 and 5000 µg/plate purity unknown	Not mutagenic with or without metabolic activation.
		L5178Y $tk^{+/-}$ 3.7.2C mouse lymphoma cells	Mouse lymphoma (Clive and Spector) Concentration: 1.1, 1.2, 1.3, 1.4, 1.5,and 1.6 µL/mL purity unknown	Not mutagenic with metabolic activation. Result without metabolic activation is equivocal.
5.6	GENETIC TOXICITY *IN VIVO*	No data available		
5.7	Carcinogenicity	**No data available**		
5.8	Reproduction Toxicity	**Rats, Albino Crl:CD (SD)**	**Oral through diet; daily for 13-weeks. Doses: 118.5, 23.8, 4.8 mg/kg (males); 120.2, 24.3, 4.8 mg/kg (females) purity unknown**	**No changes in testicular weight or microscopic pathology of the testes or ovaries were observed.**
		Rats, Wistar outbred (Crl:(WI)WU BR)	**Oral by gavage, daily for at least 10 weeks (premating, mating, gestation and lactation period) Dose: 5, 25 and 75 mg a.s./kg bw**	**Decreased number of live born pups, increased number of stillborn pups was observed in the high dose group. NOAEL: 25 mg a.s./kg bw**
5.9	Developmental toxicity / Teratogenicity	**Rats, Wistar outbred** (Crl:(WI)WU BR)	**OECD 415 and 416 Oral gavage, daily for at least 10 weeks Doses: 5, 25 and 75 mg a.s./kg bw**	**NOAEL for parental toxicity (microscopic effects in liver): < 5 mg a.s./kg bw Overal result, based on NOAEL reproduction: (decreased number of live born pups, increased number of stillborn pups:** NOAEL: 5 mg a.s./kg bw
5.11	Human experience	No data available		